March 3, 1949.

Dear Bernie,

It was a real pleasure to get together with you again at Chicago. I hope we can both manage it at frequent intervals.

I thought that your account of the "phenomic barrier" in the reverse mutations induced by ultra-violet was especially interesting, and your interpretation seems eminently reasonable, although I still think that the experiments that were suggested are needed to round out the story. If your interpretation does hold, it will mean that reverse-mutations may not be so convenient after all for precise quantitative mutation studies. Now that I remember it, I once tried to induce reversions in a prolineless K-12, and got essentially the story that you mentioned: no prototrophs on minimal medium, directly, but large numbers in the incubated population in complete medium, tested later. But it was a desultory kind of experiment, and I didn't keep my eyes open. I forgot to bring up the point in Chicago (mentioned very briefly in my Heredity article) that one can make an a priori calculation of the most efficient dose of UV to use from the point of view of leaving the maximum number of surviving induced mutants. This seems to apply to your kind of experiment, and it turns out that the killing should not proceed beyond pS of $\log_{10} e$, i.e. about 1/3 survivors. If there are appreciable numbers of mutants initially, the maximum number of surviving mutants (initial and induced) will be found at a survival ratio of

$$(1/e)\ \exp\ (m_o k_1/k_m)$$

where m_o is initial proportion of mutants
k_1 rate of killing
k_m rate of induced mutation.

In this case, one cannot state k_1 and k_m a priori, and all this does is to show that one should not exceed the pS given.

In hopes that it will further accelerate your interest in switching over to K-12, which you agreed was advisable, I am sending you our most important stocks. Here is the code. (I may not get around to sending all of them, so don't be disturbed if any are missing.)

K-12	Wild type
58	biotin
679	threonine
Y-10	threonine, leucine, thiamin
58-161	biotin, methionine
Y-87	biotin, methionine, Lac_1^-
W-677	threonine, leucine, thiamin, V_1^r, lactose-, maltose-, xylose-, arabinose-, galactose-, mannitol-
W-755	proline (penicillin-"resistant")
W-757	isoleucine-valine

M

W-758 IV, histidine
W-760 IV, arginine
W-761 IV, (methionine plus lysine)
W-787 histidine
W-793 (methionine plus lysine)
W-826 histidine, (serine or glycine)
W-828 histidine, (glutamic or proline)
W-831 (meth plus lys), threonine
W-832 (meth plus lys), tryptophane

SW-38 S. typhimurium. ϕalanine or tyrosine very unstable.

With these stocks, you ought to have no trouble repeating recombination studies, which should be emphasized are very easy to do. Directions in my Genetics paper are quite complete, except the plates can be incubated at 37.

If there are any other requirements that you may need in K-12, drop us a line and we'll try to find them in our files. But you should have no trouble making them!

Probably the most instructive crossing experiment to start with would be 58-161 x W-677, paying attention to the segregation of B_1-, Lac- and V_1^r.

Enclosed areca couple more postcards. They're probably the end of therrun. Have the reprints come in yet?

Best to Werner,

Sincerely,

Joshua Lederberg